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WINDFALLS AS THE CAUSE OF AN UNUSUAL WESTERN PINE BARK BEETLE EPIDEMIC

In December of 1920 a windfall of yellow pine, Douglas fir and sugar pine, estimated at 25,000,000 bd. ft. occurred on the area included in the Eel River drainage of the California National Forest. This windfall included 15,000,000 bd. ft. of yellow pine or about 5000 trees.

The windfall was followed by a season of low endemic infestation over this area, the average loss being not over 10 to 15 trees per section. During the spring of 1922, however, the whole area "blossomed out" with dying yellow pine, both singly and in large groups, which proved to indicate an unusual western pine bark beetle epidemic; the loss on a check area of 768 acres increasing from 28 trees with a volume of 60,190 bd. ft. in 1921 to 225 trees with a volume of 403,810 bd. ft. in 1922. Most of this increase occurred in the summer of 1922. The infestation dropped back to an endemic condition as suddenly as it had risen, the 1923 loss on the check area being only 13 trees or 23,980 bd. ft. Since an increase of this nature is a very unusual occurrence a number of examinations of the area were made in an attempt to find an explanation both for the sudden increase of 700% and the sudden decrease of 93% in the infestation.

The heavy windfall preceding the epidemic offered the only evident explanation for the increase. Studies of this windfall in October 1924 give an estimated emergence of 20,000,000 beetles while the number of beetles required for the 1922 attack is placed at 59,000,000. This shows that although the windfalls were undoubtedly an important factor they are hardly satisfactory as a complete explanation. Their importance is further lessened by the fact that a considerable part of this emergence occurred during the summer of 1921, too early for the 1922 attack.

The sudden drop in the infestation is just as difficult a problem. A partial solution is found in the fact that while the attack on the 1922 trees was exceptionally heavy - up to 50 beetles per square foot - the emergence was far below normal, in many cases actually less than the number attacking. The flight mortality is normally 80% of the emergence so that a low emergence with a mortality a little higher than normal would account for a decided decline in the infestation.

An analysis of the growth rings from 1919 to 1923 shows a 20% reduction in growth for 1922, the year of the epidemic and a recovery to the normal growth rate in 1923. This reduction and recovery of growth may be a contributing factor in the sudden increase and sudden decline of the infestation. It is not unusual enough, however, to be of much importance, by itself, since such variations in growth are found with no corresponding effect upon the infestation.

What actually caused this insect outbreak would be difficult to prove. It is believed, however, that the windfalls together with some weakened condition of the tree, as shown by a decrease in the width of the annual rings, are factors of primary importance.

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